

ABSTRACT

- An optical apparatus comprises a reflective liquid crystal (LC) panel, and an
- 5 optical device. The LC panel includes a twisted-nematic (TN) LC material, wherein one mode of the LC material includes a 90 degree twist (90TN0). A color sequential light valve may incorporate the LC material with the 90 degree twist (90TN0). The LC panel beneficially exhibits a contrast of at least approximately 1000:1. Moreover the LC panel exhibits minimal divergence between transfer characteristics for different colors of the optical system.
- 10 Furthermore, the LC panel provides a higher contrast and superior uniformity in both dark and bright states, compared to known LC devices. Finally, the use of retarders in LC-based systems may be minimized or eliminated using the LC panel.